

物理系

Department of Physics

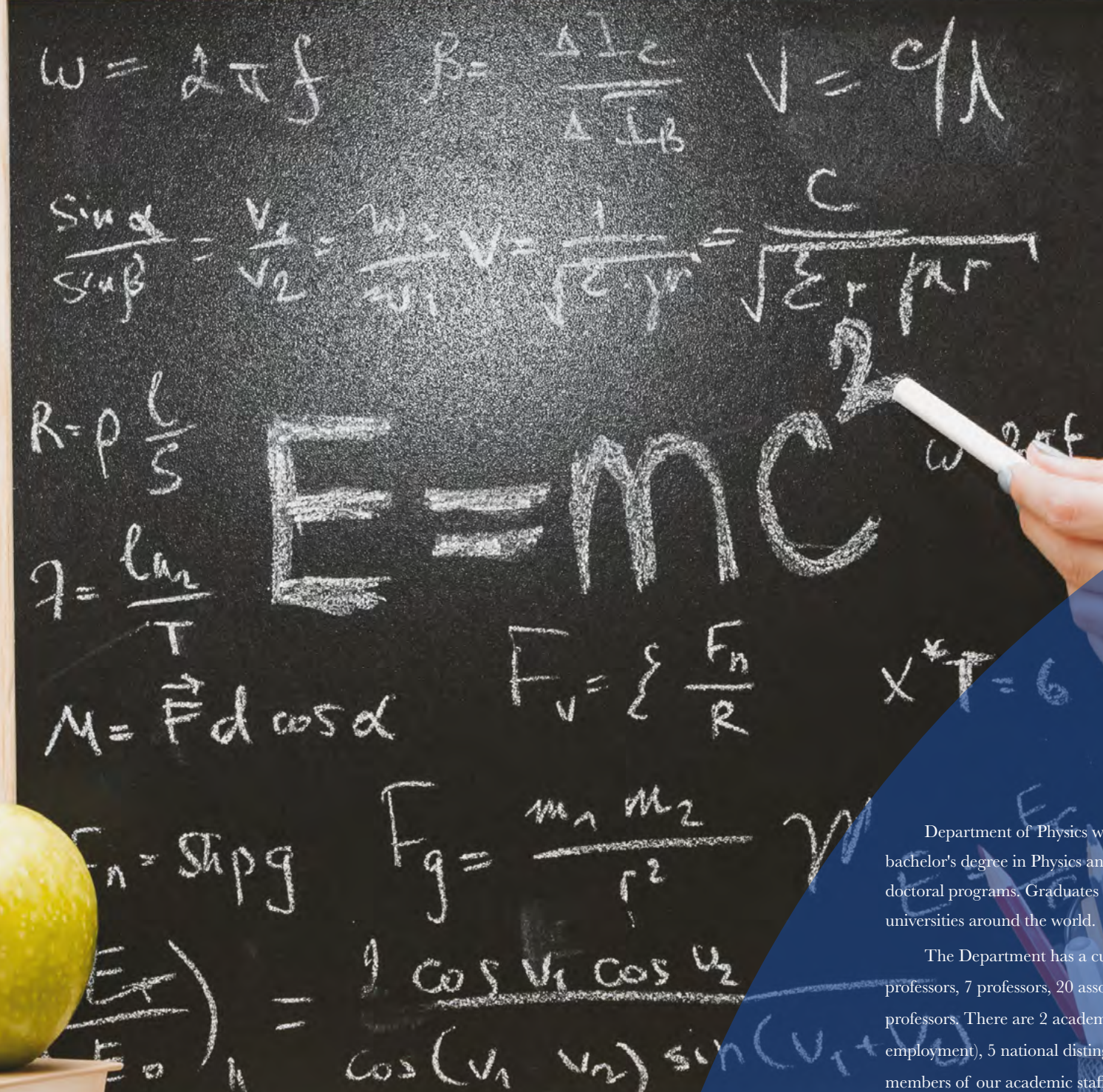
本系简介

About Us

物理系是 2011 年南方科技大学首批设立的五个院系之一。现有物理学和应用物理学两个本科专业，物理学一级学科硕士点，物理学一级学科博士点和博士后流动站；已建成完整的从本科、硕士、博士到博士后的人才培养体系。物理系毕业生理论基础扎实、科研能力突出，超过七成的学生升学深造，广泛活跃在北大、牛津等国内外高等院校和科研机构。

物理系吸引了国内外的大批青年才干，现有 41 名专职教师，其中讲席教授 6 人，教授 7 人、副教授 20 人、助理教授 6 人、教学教授 2 人，大部分毕业或曾就职于世界 Top100 大学或研究所。高端人才有中科院院士 2 位、国家杰出青年 5 位、广东省“珠江计划”领军人才 3 位、深圳市“鹏城学者” 6 位。一流的人才给物理系带来了卓越的成果。

截至 2021 年 6 月，我系已独立承担 200 余项国际级、地方级的科研项目，包括国家自然科学基金项目 97 项，科技部、教育部项目 17 项，广东省自然科学基金项目、重点领域研发计划及联合基金等 40 项，深圳市项目 78 项，科研经费累计逾 5.82 亿。我系教师在 Nature、Science、Physical Review X、Physics Review Letters 等学术刊物上累计发表论文逾 1700 篇，其中以南科大为第一或通讯作者单位的文章 944 篇，影响因子 > 10 或者 PRL 等顶级期刊有 248 篇。体现了我系科研人员深厚的学养和突出的科研能力。



Department of Physics was founded in 2011. It has been granted authority to award bachelor's degree in Physics and Applied Physics and also offers master, doctoral and post-doctoral programs. Graduates of the department are recognized by institutes and renowned universities around the world.

The Department has a current size of 41 academic faculty, including 6 chair professors, 7 professors, 20 associate professors, 6 assistant professors and 2 teaching professors. There are 2 academicians of Chinese Academy of Sciences (including joint employment), 5 national distinguished young scholars, and 6 “Pengcheng” scholars. All members of our academic staff have study or work experience at top 100 universities around the world.

In recent years, our staff members have published many papers in high profile journals, gaining the Department international impact. Our research support totaled more than 582 million (CNY), including 97 projects from National Natural Science Foundation of China, 17 projects from Ministry of Science and Technology and Department of Education, 40 projects from Guangdong Natural Science Foundation, Key Field R&D Plans and Joint Funds, and 80 projects from Shenzhen City. Our academic staff have published over 1700 papers in journals of physics including Nature, Science, Physical Review X, Physics Review Letters, etc.

学科概览 Discipline Overview

我系研究领域涵盖物理科学及系列前沿研究方向，设有凝聚态物理、理论物理、计算物理和光学四个二级学科，同时正在布局天体物理、粒子物理、生物物理等方向的学科建设。在学科建设方面，物理系在多个公认大学及学科排名上，取得了亮眼的成绩：泰晤士 2021 学科评级中，南科大物理学评级为 A；软科 2021 中国大学专业排名中，物理学位列第 14 位；在 2021 Nature Index 排名中，Physical Science 在 Nature Index 官网排名上升至全国高校第 9 名（包括香港高校）。

Department of Physics now offers 4 majors in condensed matter physics, computational physics, theoretical physics and optics, while setting up astrophysics, particle physics and biological physics. Our Physics discipline is rated as "A" in the subject rating of the THE 2021, it also ranked 14th in 2021 ShanghaiRanking's Chinese University Ranking of Academic Major and 9th in mainland China at the ranking of 2021 Nature Index

凝聚态物理实验 Experimental Condensed Matter Physics

研究内容：

在极低温及强磁场等条件下，对各种新兴低维系的物理性质，特别是电子或自旋的量子输运性质、拓扑绝缘体等新型量子效应的研究及相关的量子调控新原理、新方案进行深入而全面的研究。

Research Contents:

Physical properties of various emerging thin film materials will be investigated systematically under ultra-low temperature and high magnetic field conditions, especially the quantum transport of electrons or spins in these materials. We will also aim to effectively control the novel quantum phenomena revealed in these materials by optical, electrical, or magnetic means.

原子分子与光物理 Atomic, Molecular and Optical (AMO) Physics

研究内容：

冷原子物理及原子光学与原子玻色－爱因斯坦凝聚：纳米结构和纳米光学；全固化激光器物理及应用；近场光学；光谱学。

Research Contents:

Cold atom/molecule physics; atomic optics and atomic Bose-Einstein condensation; Nano structure and nano optics; all-solid-state laser physics and the application; near-field optics; optical spectroscopy.

材料物理 Material Physics

研究内容：

探索新型功能材料，发展和完善各种功能材料的制备方法，研究材料的光学、热学、电学、磁学、声学以及力学等性能。

Research Contents:

Search for novel functional materials, develop and improve the synthesis techniques of various functional materials, study their corresponding photonic, thermal, electronic, magnetic, phonic and mechanic properties.

研究内容：

计算物理是物理学的重要分支之一，与理论物理和实验物理相互补充。研究领域涵盖不同维度下的半导体、金属、绝缘体等多种材料，并设计和预测多种新材料。

Research Contents:

Computational physics is an important branch of physics, which has a multitude relationship with theoretical physics and experimental physics. The research is mainly to study the fundamental properties of different dimensional materials using combined theoretical calculations and experiments. Furthermore, we also design and predict the new materials.

计算物理 Computational Physics

研究内容：

主要是对强关联电子系统包括高温超导理论、分数量子霍尔效应、磁性理论及数值的研究。

Research Contents:

Theoretical study mainly focuses on the strongly correlated electron systems, including high-T_c superconductivity, fractional quantum Hall effect, and magnetic theory and its numerical investigations.

凝聚态物理理论 Theoretical Condensed Matter Physics

研究内容：

量子计算机的结构与实现、量子信息的原理和应用、量子通信网络的设计和实现等。

Research Contents:

It mainly focuses on the structure and implementation of a quantum computer, the principle and application of quantum information, the design and implementation of quantum communication network, etc.

量子信息与量子计算 Quantum Information and Quantum Computation

研究内容：

研究比原子核更深层次的微观世界中物质的结构性质，和在很高的能量下，这些物质相互转化的现象，以及产生这些现象的原因和规律。研究天空物体的性质及它们的相互作用。

Research Contents:

High-energy Physics mainly focuses on the structural properties of substances in the micro world smaller than nuclei, and the phenomena of mutual transformation between these substances under extremely high energy, as well as the causes and laws of these phenomena. Study the properties of astronomical object and their interactions.

高能物理及天体物理 High-energy Physics and Astrophysics

Research Space



科研空间 Research Space

物理系实验室硬件条件完善，拥有包括表面反应及分析仪、球差校正透射电子显微镜、电子束曝光机、超导核磁共振谱仪、综合物性测量系统、分子束外延机、聚焦离子束仪、自旋成像的角分辨光电子能谱仪、高性能计算系统和无液氦超导磁体变温测量仪等在内的总价值超过 3.5 亿元人民币的仪器设备，为学术研究提供了强有力的支持。

The Department of Physics has well-equipped laboratories, boasting surface reaction analyzer, spherical aberration correction transmission electron microscope (TEM), electron beam exposure (EBE) machine, superconducting nuclear magnetic resonance spectrometer, physical property measurement system (PPMS), molecular beam epitaxy (MBE) machine, focused ion beam (FIB) instrument, spin imaging angle-resolved photoemission spectroscopy (ARPES), high-performance computing systems, and non-liquid helium variable temperature measurements with superconducting magnet, with a total value of more than RMB 350 million, providing a strong support for academic research.

物理系已建成包括皮米尺度上的基础和应用研究中心、量子科学与工程研究院、中子科学中心、纳米结构与纳米能源实验室、量子输运实验室、薄膜物理实验室等在内的 30 余个科研平台 / 专业实验室，总面积超过 5000 平方米。

The Department has set up more than 30 scientific research platforms and specialized laboratories, including the Picometer-scale Fundamental & Applied Research Center, the Institute of Quantum Science and Engineering, the Neutron Science Center, the Nanostructure & Nano Energy Laboratory, the Quantum Transport Laboratory, the Thin Film Physics Laboratory and so on, covering a total floor area of 5,000 square meters.

1. 环境球差校正透射电子显微镜 Environmental Cs Corrected TEM
2. 静电纺丝机 Electrospinning machine
3. 表面分析系统 Surface analysis system
4. 2018 年 3 月 Quantum Gravity 会议
Quantum Gravity Conference 2018
5. 澳大利亚国立大学来我系交流
Exchanges with Australian National University

对外交流 Exchanges & Cooperation

2017 年以来，我系举办学术报告 230 余场、南科大讲堂 15 场；累计接待杰青、两院院士、诺奖获得者等高水平专家超过百人。此外我系举办了 QIP2020、“新材料与能源科学”高峰论坛、香港深圳量子信息联合会议等国际学术会议和论坛，邀请国内外本领域的学术带头人与科研新秀来访交流。

Since 2017, our department has held more than 220 academic reports and 15 SUSTech lectures; received over 100 high-level experts including outstanding youths, academicians of the Chinese Academy of Sciences and Chinese Academy of Engineering, and Nobel Prize winners. Besides, our department organized international academic conferences and forums such as QIP2020, “New Materials & Energy Science” Summit Forum, and Hong Kong-Shenzhen Workshop on Quantum Information Science. Academic leaders and young research talents in physics at home and abroad are welcomed to exchange views here.

物理系积极组织师生到世界各地参加各类学术会议，宣传我系的优秀工作成果，与各国专家学者一起探讨学术研究的前沿动态与发展趋势。另外从 2016 年起，南科大物理系与北京大学、哈尔滨工业大学、香港大学、香港科技大学、新加坡国立大学、利兹大学等境内外知名高校开展研究生联合培养，满足双校毕业标准和论文要求的学生可获得合作高校学位以及南科大学历证明。

The Department of Physics is active in organizing events for teachers and students to get more engagement in various academic conferences around the world, to publicize our excellent achievements, and to exchange the latest updates and development trends in academic researches. Since 2016, the Department of Physics started to conduct joint training programs with Peking university, Harbin Institute of Technology, University of Hong Kong, Hong Kong University of Science and Technology, National University of Singapore, University of Leeds, and other prestigious universities at home and abroad. Double academic degrees will be conferred on students who have satisfied the requirements for graduation at each of the universities.

学子风采
Meet Our Students

从 2011 年开始，物理系开始招收本科生。据统计，历届本科生共参与科研项目 40 项（学生为项目负责人），其中 5 项国家级大创项目，7 项省级大创项目，3 项省级攀登项目；发表 SCI 论文 80 余篇，其中以一作或共同一作发表 30 篇，部分学生在物理学顶级期刊 Phys. Rev. Lett.、Phys. Rev. X 上以第一作者发表论文；获授权专利 3 项，其中一作 2 项；获省级以上学科竞赛奖励 100 余人次 物理系大部分本科毕业生选择继续深造，包括境外升学、境外联培、保研、考研等，近三届毕业生深造率分别为：70%、84%、86%，远高于学校平均水平 60%。

从 2016 年开始，南科大与北京大学、哈尔滨工业大学、香港大学、香港科技大学、新加坡国立大学、利兹大学等境内外知名高校开展研究生联合培养。2018 年，物理学科分别获得物理学一级学科硕士、博士学位授权点，开始培养南科大自主研究生。2019 年 10 月获批物理学博士后科研流动站。物理系研究生的科研成果令人瞩目，仅

在 2020 年，物理系研究生在国际一流期刊上发表论文 90 篇，研究生作为一作或共同一作的论文接近半数。毕业生理论基础扎实、科研能力突出，超过七成的学生升学深造，广泛活跃在北大、牛津等国内外高等院校和科研机构。

Up to now, our undergraduates have participated in 40 scientific research projects at both state and provincial levels. Their researches are also fruitful, with over 80 papers being published on SCI journals, 30 of which were finished as the first or co-first author. They have multiple patents and have excellent performance at various competitions. We are happy to see that the proportion of graduates enrolled in famous universities for further study have exceeded 70% for three consecutive years.

Since 2016, SUSTech has carried out joint postgraduate training program with Peking University, Harbin Institute of technology, University of Hong Kong, National University of

Singapore, Leeds University and other well-known universities at home and abroad. In 2018, the Department started to recruit postgraduates independently. The research achievements of our postgraduates are remarkable. In 2020 alone, they published 90 papers on world-class journals, and nearly half of the papers were finished by students as the first or co-first author. Graduates have a solid theoretical foundation and outstanding scientific research ability. More than 70% our graduates have furthered their study in renowned universities or research institutions.

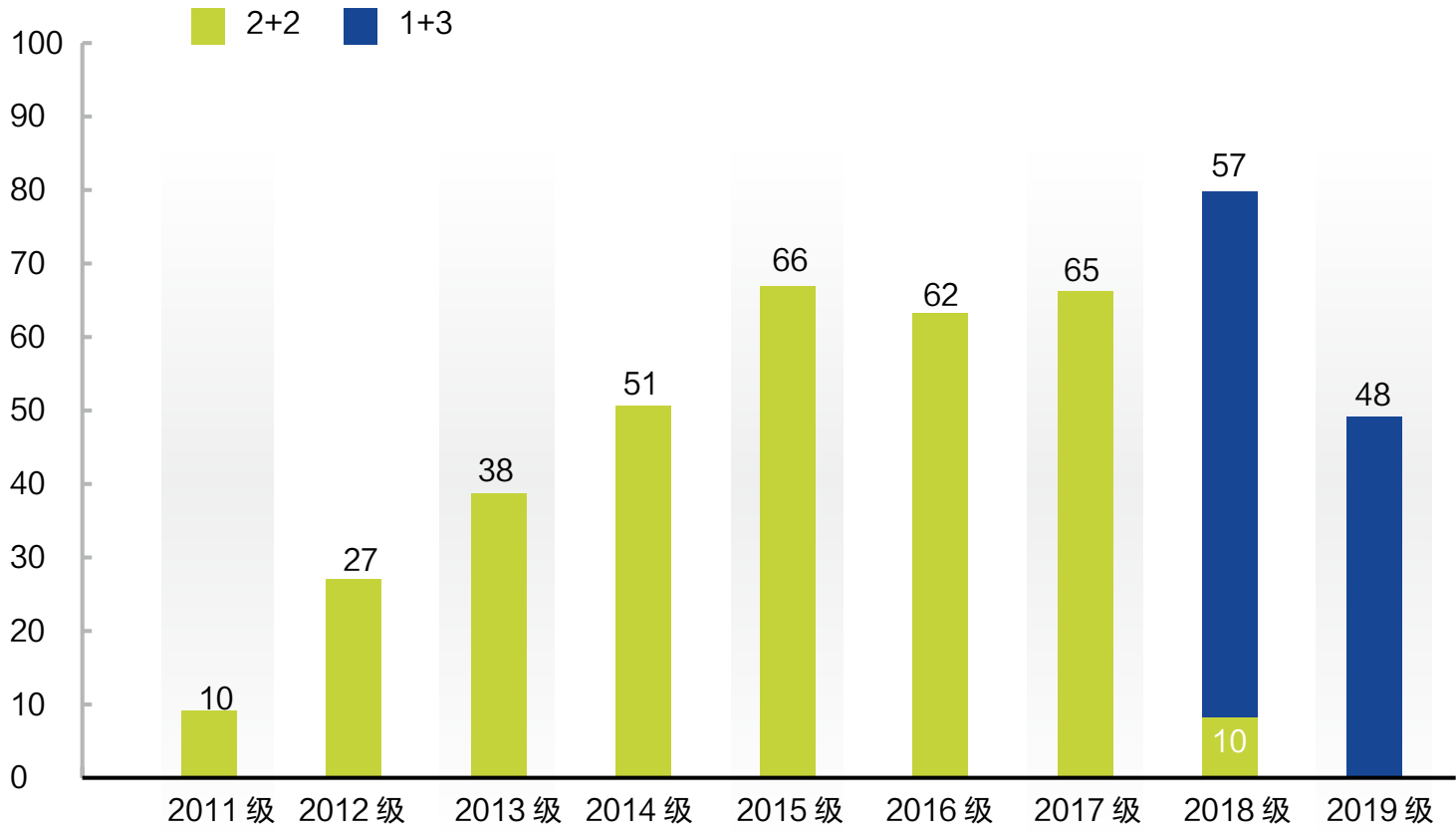
硕士研究生培养情况一览表

培养学校	2016 级	2017 级	2018 级	2019 级	2020 级	2021 级
南科大自主				46	50	50
哈工大联培	19	29	35			

博士研究生培养情况一览表

培养学校	2016 级	2017 级	2018 级	2019 级	2020 级	2021 级
南科大自主				31	29	27
哈尔滨工业大学	4	8	19	3		
北京大学	2		1			
澳门大学	2		1			
香港大学	3	4	4	1	2	2
香港科技大学	3	4	3	2	3	
香港理工大学				1		
香港浸会大学				1		
新加坡国立大学		1	3	3	1	
悉尼科技大学			2			
昆士兰大学				1	1	
利兹大学			1			
香港城市大学						2
学生总人数	14	17	34	43	36	31

物理系历届本科生录取情况（在系师生比 1:5）



学生动态
Student's Activities

2020 年 1 月，物理系 2017 级本科生王凌飞、钟海文和其他队员组成的参赛团队在“2019 年美国大学物理竞赛”中获得银奖。

In January, 2020, Lingfei WANG, Haiwen ZHONG (class of 2021) got silver award in the 2019 University Physics Competition.

2020 年 1 月，物理系 2017 级本科生田致远、冯锴和其他队员组成的参赛团队在“2019 年美国大学物理竞赛”中获得银奖。

In January, 2020, Zhiyuan TIAN, Kai FENG (class of 2021) got silver award in the 2019 University Physics Competition.

2020 年 8 月，物理系 2018 级本科生卞凯明、邵天浩和其他队员组成的参赛团队在“2020 中国大学生物理学术竞赛（中南赛区）”中获省级三等奖。

In August, 2020, Kaiming BIAN, Tianhao SHAO (class of 2022) won the third prize at provincial level in China Undergraduate Physics Tournament (Central South Division)

2020 年 12 月，物理系 2019 级本科生肖天翼、江一帆和其他队员组成的参赛团队在“2020 全国大学生物理实验竞赛”中获国家级一等奖。

In December, 2020, Tianyi XIAO, Yifan JIANG (class of 2023) won the first prize at state level in the 2020 National College Student Physics Experiment Competition.



为庆祝中国共产党百年华诞，2021 年 6 月-7 月 2019 级博士生周良、陈见，以及研究生第一、第二党支部委员和党员策划组织党史知识竞赛活动，以“强国梦文创桌游”为载体乐学党史。

To celebrate the 100th anniversary of the CPC, doctoral students Liang ZHOU, Jian CHEN and other members of Postgraduate's Party Committees organized a Party history contest.

毕业生风采
Excellent Graduates



张蔡婕
Caijie ZHANG

2021 届物理学本科生，毕业后直博北京大学物理学院。南方科技大学 2021 届本科“十佳毕业生”候选人，校级大创项目负责人。在校期间活跃于各类省市级定向赛，美国大学生数学建模比赛，亚太地区大学生数学建模竞赛等，并获多个奖项。

Caijie ZHANG, undergraduate of class of 2021. She was a candidate of SUSTech 2021 Undergraduate Summa Cum Laude. During her undergraduate years, she participated in a college students' science and technology innovation project and gave excellent performance in orienteering competitions, Mathematical Contest in Modeling, Asia and Pacific Mathematical Contest in Modeling, etc..

2021 届南科大-哈工大联培博士生。2021 年南方科技大学“研究生十佳毕业生”，南方科技大学“优秀博士学位论文”获得者。在翁文康副教授指导下从事几何量子调控和固态量子计算方向的研究，毕业后前往麻省大学阿默斯特分校做博士后。以一作/共一在 Physical Review Letters 等知名期刊上发表多篇学术论文。

Baojie LIU, Ph.D graduate of SUSTech-HIT joint program. He has been honored Postgraduate Summa Cum Laude of SUSTech in 2021 and his doctoral thesis was recognized as Excellent Doctoral Dissertation of SUSTech. Baojie LIU has published multiple research papers on renowned journals, including Physical Review Letters, Quantum Science and Technology, etc..



刘宝杰
Baojie LIU



- 1. 参观深圳工业展览馆
A Visit to Shenzhen Industrial Museum
- 2. 研究生党支部广州红色之旅活动
Postgraduate Party Building Activity in Guangzhou
- 3. 物理系图书角
Book Corner of the Department of Physics
- 4. 新生沙滩足球赛
Beach Soccer Game of the Freshmen
- 5. 体育活动
Sports Activity



何佳清 Jiaqing HE

系主任、讲席教授
Chair of Dept. of Physics, Chair Professor
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1998 年获得武汉大学物理学学士学位；2004 年获得武汉大学和德国于利希研究中心联合培养的物理学博士学位，师从著名电子显微镜专家 Knut Urban 教授和王仁卉教授；博士毕业后 2004–2012 年先后在美国布鲁克海文国家实验室和美国西北大学工作。现为南方科技大学物理系讲席教授，研究方向主要包括透射电子显微术、热电材料和结构与物理性能关联性。何佳清教授在 SCI 杂志上发表论文 240 余篇，其中包括 Nature 和 Science 等影响因子大于 10 的论文近 140 篇。文章被引用 23000 多次，H 因子 72。近年来主持国自然重点等科研项目 10 余项。

Jiaqing He is a full professor at Southern University



陈朗 Lang CHEN

科研副系主任、教授
Deputy Chair for Research Affairs, Professo
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曾为美国马里兰大学博士，法国国家科研中心博士后。获得了深圳市海外高层次人才“孔雀计划”B 类人才启动经费支持和 2015 年度深圳市鹏城学者凝聚态物理长期特聘教授称号。目前共发表论文 130 多篇，包括 Nature 子刊, PRL, Adv. Mater. 等一流期刊，被引大于 4000 次，H 因子 36。目前共主持过各类科研经费 3000 多万元。

of Science and Technology(SUSTech). He received his joint Ph.D. degree in physics from both Juelich Research Center and Wuhan University in 2004. He was a post-doctor at Brookhaven National Laboratory (2004–2008), research associate (2008–2010) and research assistant professor (2010–2012) at Northwestern University. His research interests include transmission electron microscopy, thermoelectric materials, and structure and property relationship. He has published over 240 papers on SCI journals, including Nature and Science, and his papers have been cited over 23 , 000 times with a h-index 72. He’s also presided over 10 state-level research projects.

Prof. Chen obtained his Ph.D. in University of Maryland and worked as postdoc fellow in CNRS, France. He has published more than 130 journal papers, which has been cited over 4000 times with a h-index 36. He has presided over 7 state-level research projects and 7 provincial and municipal level projects with total amount over 30M Yuan.



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博士毕业于上海交通大学物理系，后前往清华大学高等研究中心做博后，并在意大利国际理论物理中心、意大利 Padova 大学、香港大学物理系做访问学者。研究方向为分数统计、低维量子场论在凝聚态物理中的应用、关联系统的数值算法。

Prof. YE obtained his Ph.D at Department of Physics, Shanghai Jiaotong University. He then worked as post-doctor

at Center for Advanced Study, Tsinghua University, and visiting scholar at International Centre for Theoretical Physics, University of Padova, Italy and Department of Physics, University of Hong Kong. His research focuses on fractional statistics, low-dimensional quantum field theory’ application in condensed matter physics and numerical algorithm for correlated system.



林君浩 Junhao LIN

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美国田纳西州 Vanderbilt 大学物理学博士，毕业后获日本振兴学会（JSPS）特聘研究员资格，赴日本国立产业综合研究所电子显微镜研究组进行博士后研究。林君浩博士利用高分辨扫描透射电镜和第一性原理计算作为研究工具，致力于实验与理论相结合的手段研究二维材料中原子结构与材料性能之间的关联，以期通过结构工程获得性能更优异的新型材料。近年来的主要研究兴趣为透射电子显微学新技的发展，以及新型二维铁磁与铁电材料缺陷的精确测量及其对磁性与极化的影响。近 5 年来，在 Nature、PRL、Advanced Materials、ACS Nano 等高影响期刊发表 80 余篇文章，总引用次数超过 8600 多次，H 因子 38。担任广东省“珠江人才计划”创新创业团队带头人，深圳市孔雀计划”高层次人才团队带头人，深圳市新型量子功能材料与器件重点实验室执行副主任。

Dr. Junhao Lin obtained his PhD degree of Physics from Vanderbilt University, USA, in 2015. He was trained in both theoretical density functional theory (DFT) and experimental scanning transmission electron microscopy (STEM), and combine these two techniques synergistically to investigate the structure-property correlations in two-dimensional (2D) materials. He had his postdoctoral work as a JSPS fellow in AIST, Japan from 2015, hosted by Dr. Kazu Suenaga, and continue the research mostly in 2D materials with low-voltage monochromatic S/TEM. He is now an associate professor in the Physics Department, Southern University of Science and Technology (SUSTech). His main research direction includes analysis of complex defect structures in novel layered materials, real time in-situ observation of the dynamical processes in structural transition of materials under various environmental stimulations, and the development of stable 2D ferromagnetic and ferroelectric materials. He has published more than 80 journal papers, including first authored paper in Nature, Nature Nanotechnology, Nature Materials and PRL, with a total citation of more than 8600 times, H-index 38.



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